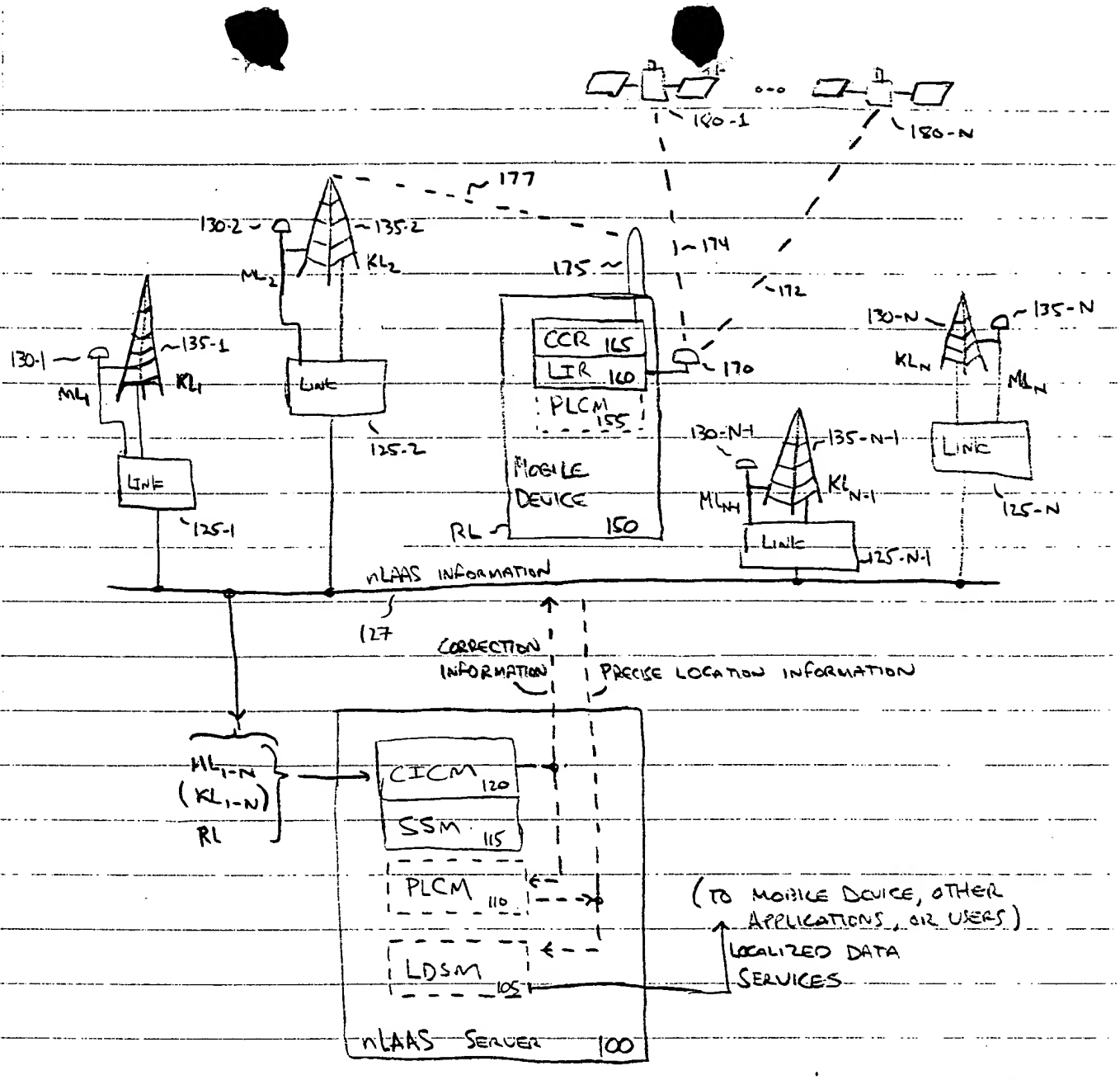

180-1
180-N
177
130-2
135-2
ML_2
KL_2
175
174
172
CCR 165
LIR 160
170
PLCM 155
MOBILE DEVICE 150
RL
130-1
135-1
ML_1
KL_1
LINK
125-2
LINK
125-1
130-N
135-N
KL_N
ML_N
130-N-1
135-N-1
ML_{N-1}
KL_{N-1}
LINK
125-N-1
LINK
125-N
nLAAS INFORMATION
127
CORRECTION INFORMATION
PRECISE LOCATION INFORMATION
ML_{1-N}
(KL_{1-N})
RL
CICM 120
SSM 115
PLCM 110
LDSM 105
nLAAS SERVER 100
(TO MOBILE DEVICE, OTHER APPLICATIONS, OR USERS)
LOCALIZED DATA SERVICES

FIG. 1

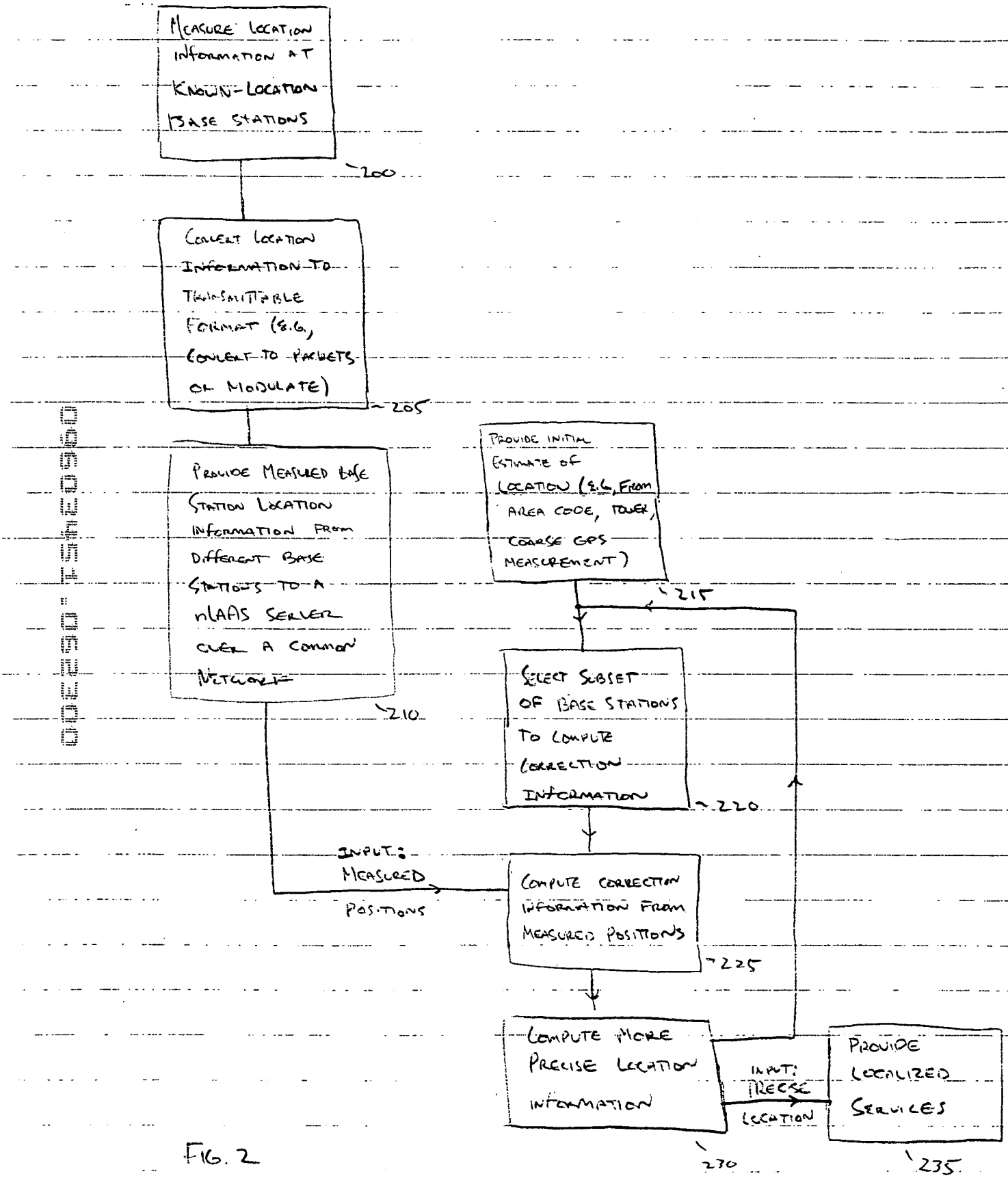

MEASURE LOCATION INFORMATION AT KNOWN-LOCATION BASE STATIONS
200
CONVERT LOCATION INFORMATION TO TRANSMITTABLE FORMAT (E.G., CONVERT TO PACKETS OR MODULATE)
205
PROVIDE MEASURED BASE STATION LOCATION INFORMATION FROM DIFFERENT BASE STATIONS TO A nLAAS SERVER OVER A COMMON NETWORK
210
PROVIDE INITIAL ESTIMATE OF LOCATION (E.G. FROM AREA CODE, TOWER, COARSE GPS MEASUREMENT)
215
SELECT SUBSET OF BASE STATIONS TO COMPUTE CORRECTION INFORMATION
220
INPUT: MEASURED POSITIONS
COMPUTE CORRECTION INFORMATION FROM MEASURED POSITIONS
225
COMPUTE MORE PRECISE LOCATION INFORMATION
230
INPUT: PRECISE LOCATION
PROVIDE LOCALIZED SERVICES
235

FIG. 2

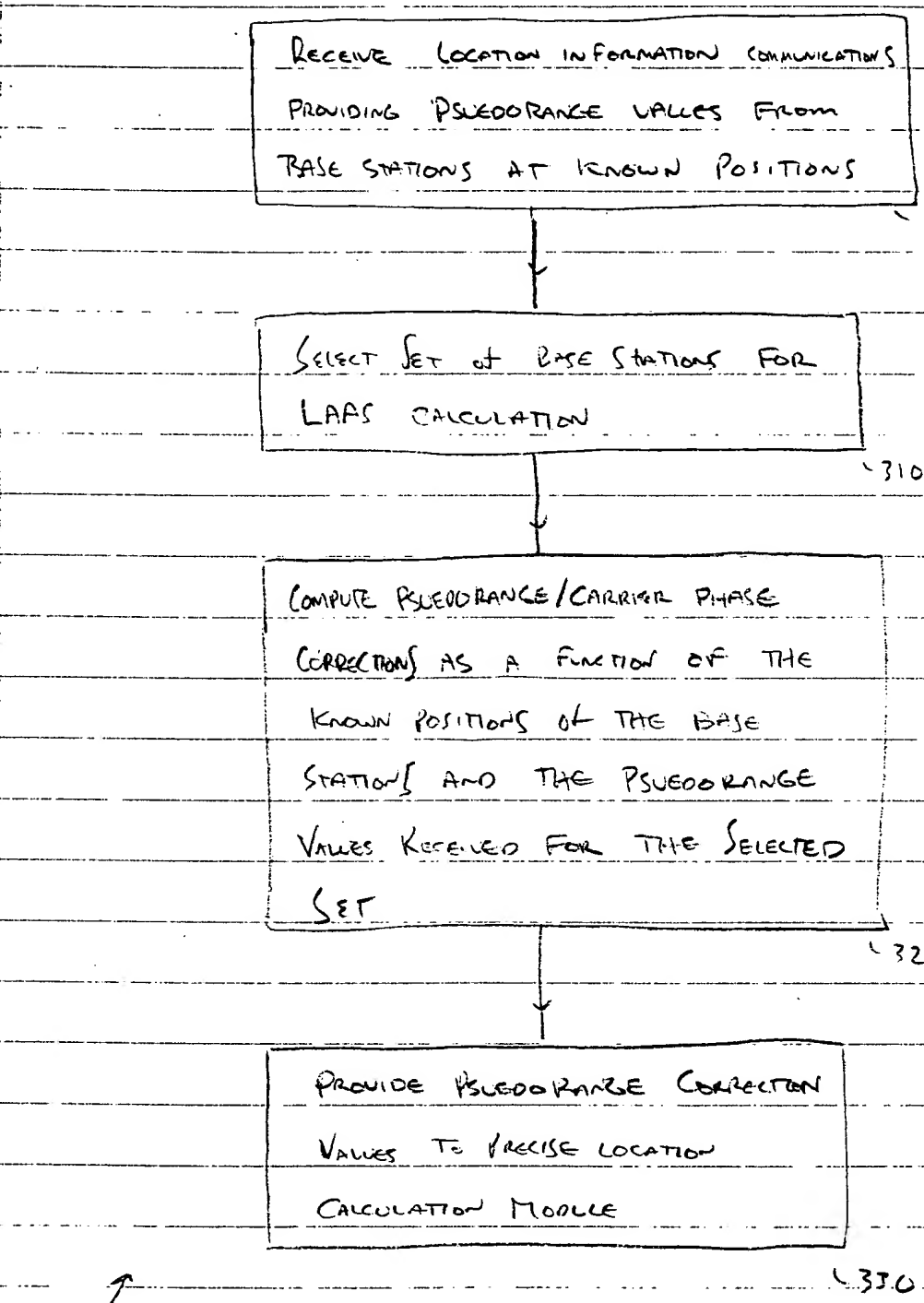

RECEIVE LOCATION INFORMATION COMMUNICATIONS PROVIDING PSUEDORANGE VALUES FROM BASE STATIONS AT KNOWN POSITIONS
300
SELECT SET OF BASE STATIONS FOR LAAS CALCULATION
310
COMPUTE PSUEDORANGE/CARRIER PHASE CORRECTIONS AS A FUNCTION OF THE KNOWN POSITIONS OF THE BASE STATIONS AND THE PSUEDORANGE VALUES RECEIVED FOR THE SELECTED SET
320
PROVIDE PSUEDORANGE CORRECTION VALUES TO PRECISE LOCATION CALCULATION MODULE
330
CICM

FIG. 3A

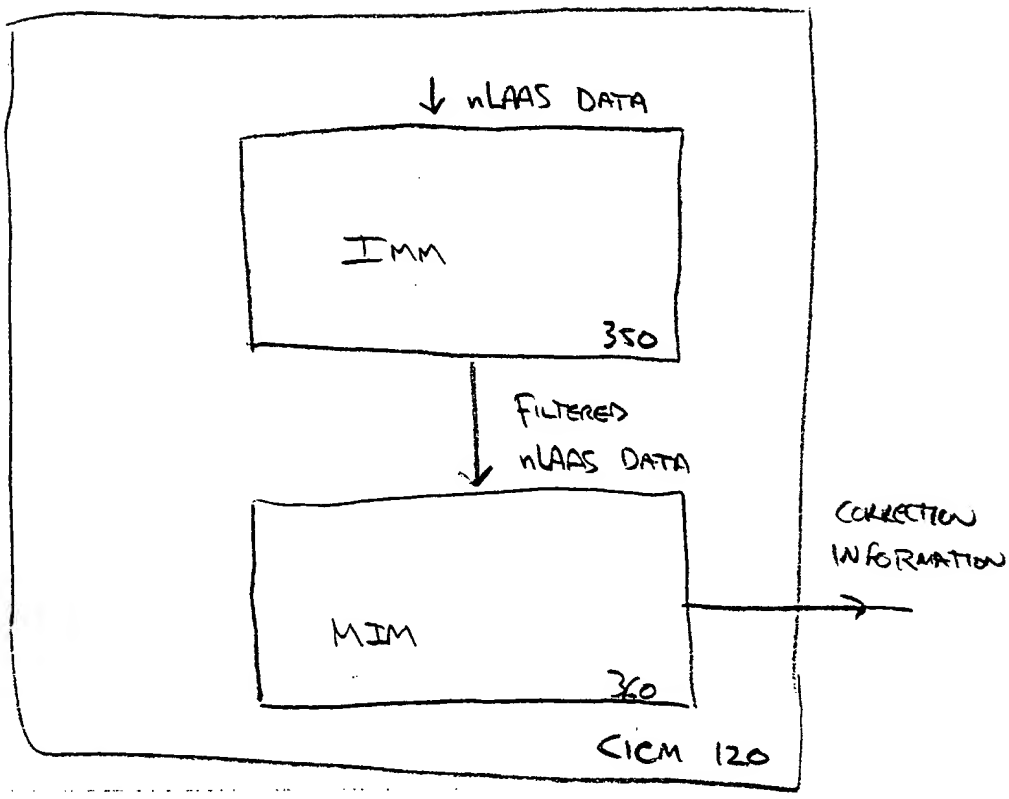
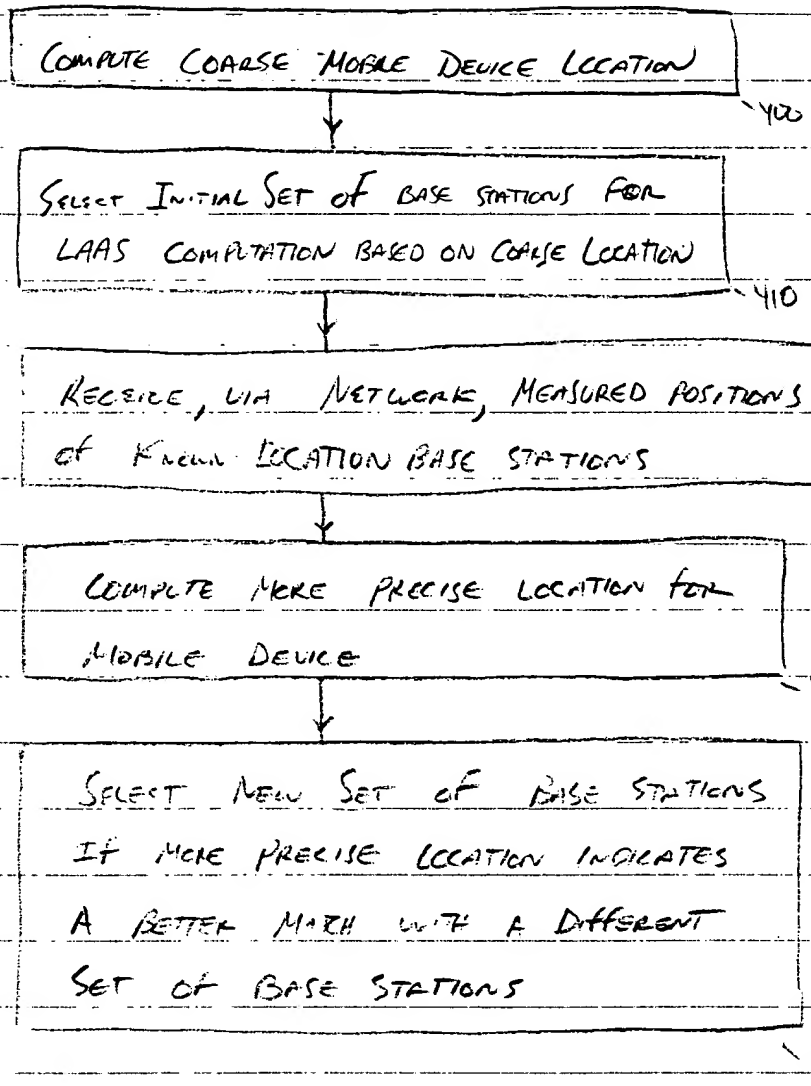

nLAAS DATA
IMM
350
FILTERED
nLAAS DATA
MIM
360
CORRECTION
INFORMATION
CICM 120

FIG. 3B


COMPUTE COARSE MOBILE DEVICE LOCATION
400
SELECT INITIAL SET OF BASE STATIONS FOR LAAS COMPUTATION BASED ON COARSE LOCATION
410
RECEIVE, VIA NETWORK, MEASURED POSITIONS OF KNOWN LOCATION BASE STATIONS
420
COMPUTE MORE PRECISE LOCATION FOR MOBILE DEVICE
430
SELECT NEW SET OF BASE STATIONS IF MORE PRECISE LOCATION INDICATES A BETTER MATH WITH A DIFFERENT SET OF BASE STATIONS
440

SSM

FIG. 4

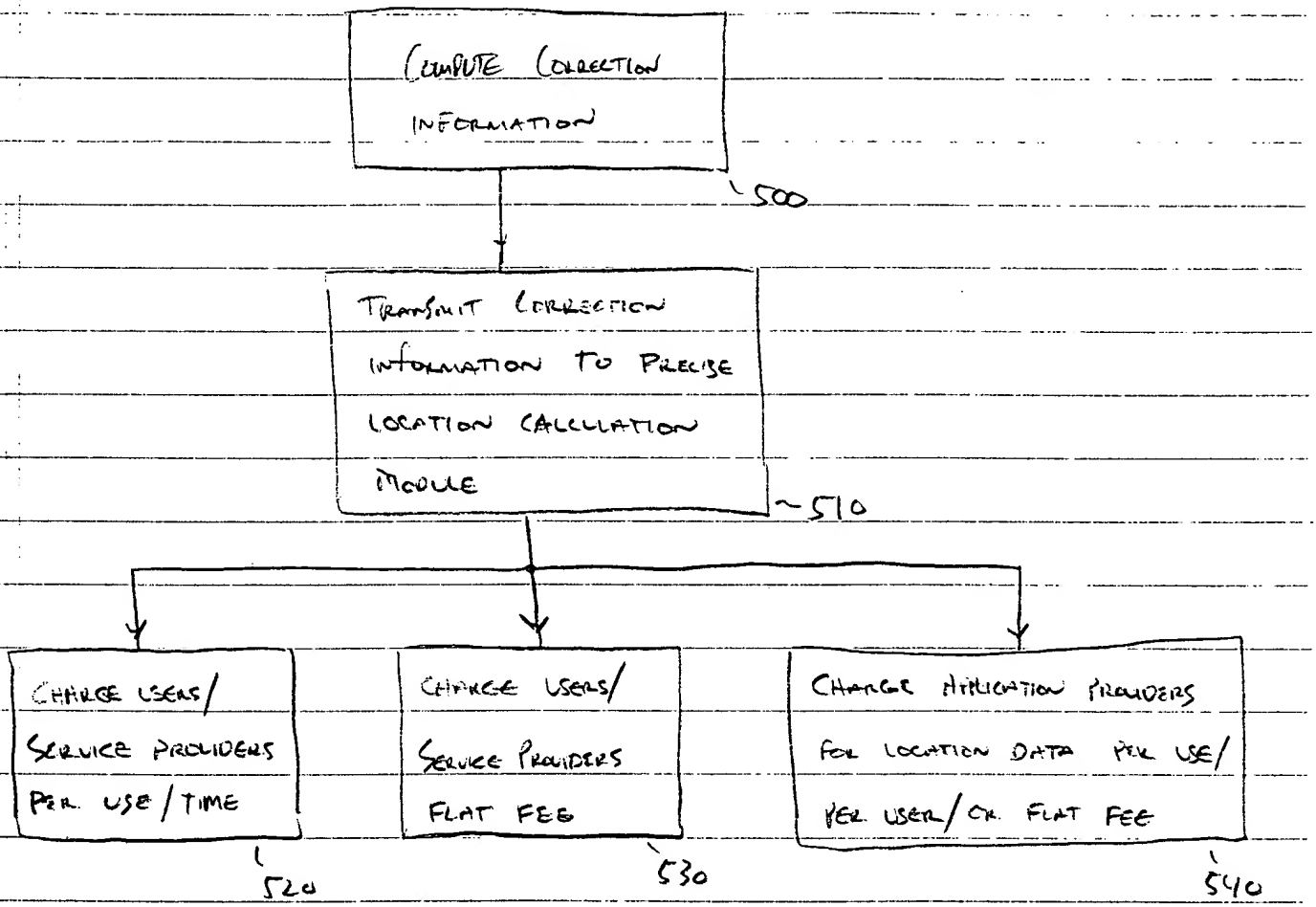

COMPUTE CORRECTION INFORMATION
500
TRANSMIT CORRECTION INFORMATION TO PRECISE LOCATION CALCULATION MODULE
510
CHARGE USERS/ SERVICE PROVIDERS PER USE/TIME
520
CHARGE USERS/ SERVICE PROVIDERS FLAT FEE
530
CHARGE APPLICATION PROVIDERS FOR LOCATION DATA PER USE/ PER USER/ OR FLAT FEE
540

FIG. 5

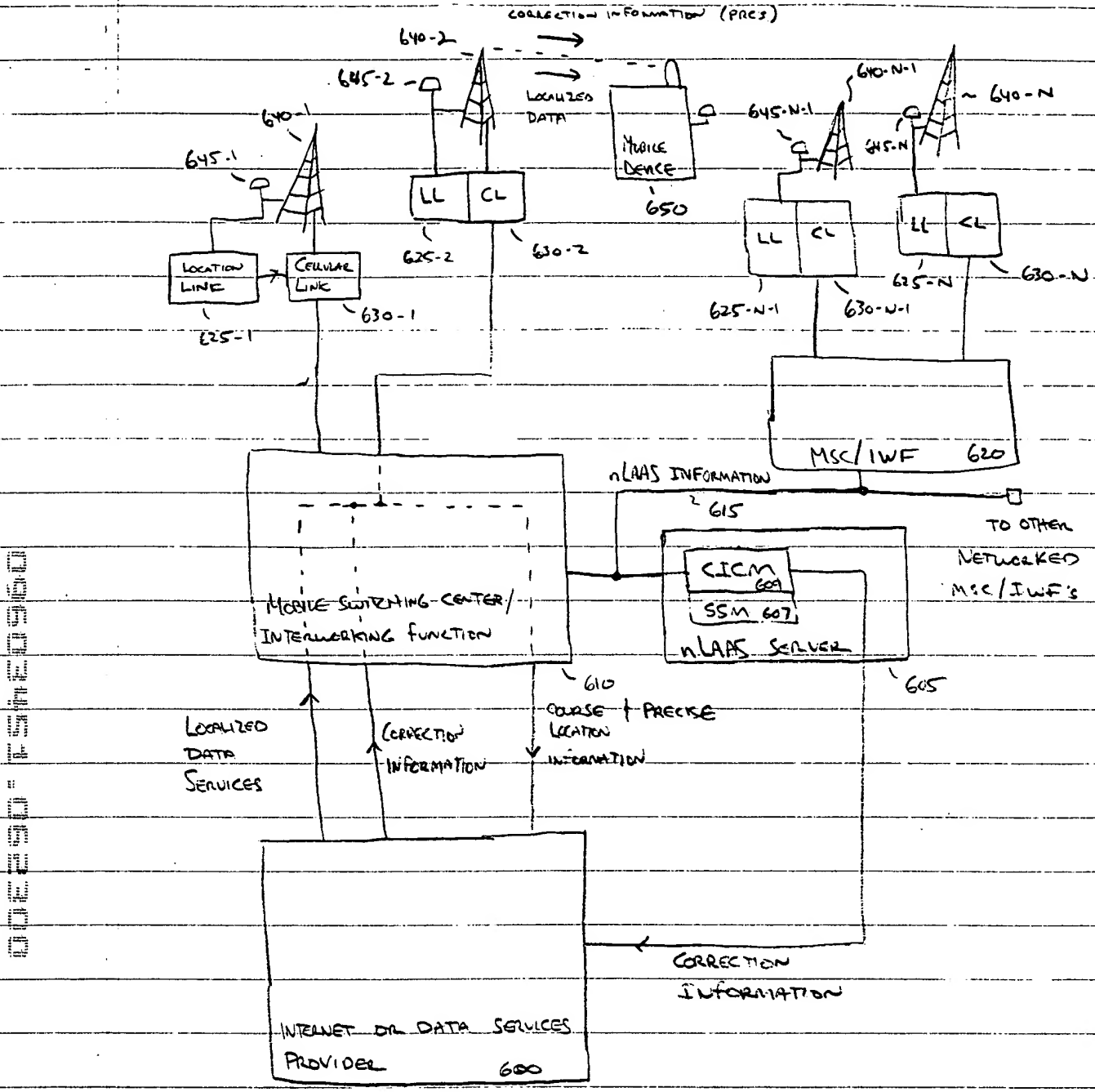

CORRECTION INFORMATION (PRCS)
640-2
645-2
LOCALIZED DATA
MOBILE DEVICE
650
640-N-1
645-N-1
640-N
645-N
640-1
645-1
LL
CL
625-2
630-2
LOCATION LINK
CELLULAR LINK
630-1
625-1
625-N-1
630-N-1
625-N
630-N
MSC/IWF 620
nLAAS INFORMATION
615
TO OTHER NETWORKED MSC/IWF's
CICM 609
SSM 607
nLAAS SERVER
605
MOBILE SWITCHING CENTER/ INTERWORKING FUNCTION
610
LOCALIZED DATA SERVICES
CORRECTION INFORMATION
COURSE + PRECISE LOCATION INFORMATION
CORRECTION INFORMATION
INTERNET OR DATA SERVICES PROVIDER 600

FIG. 6

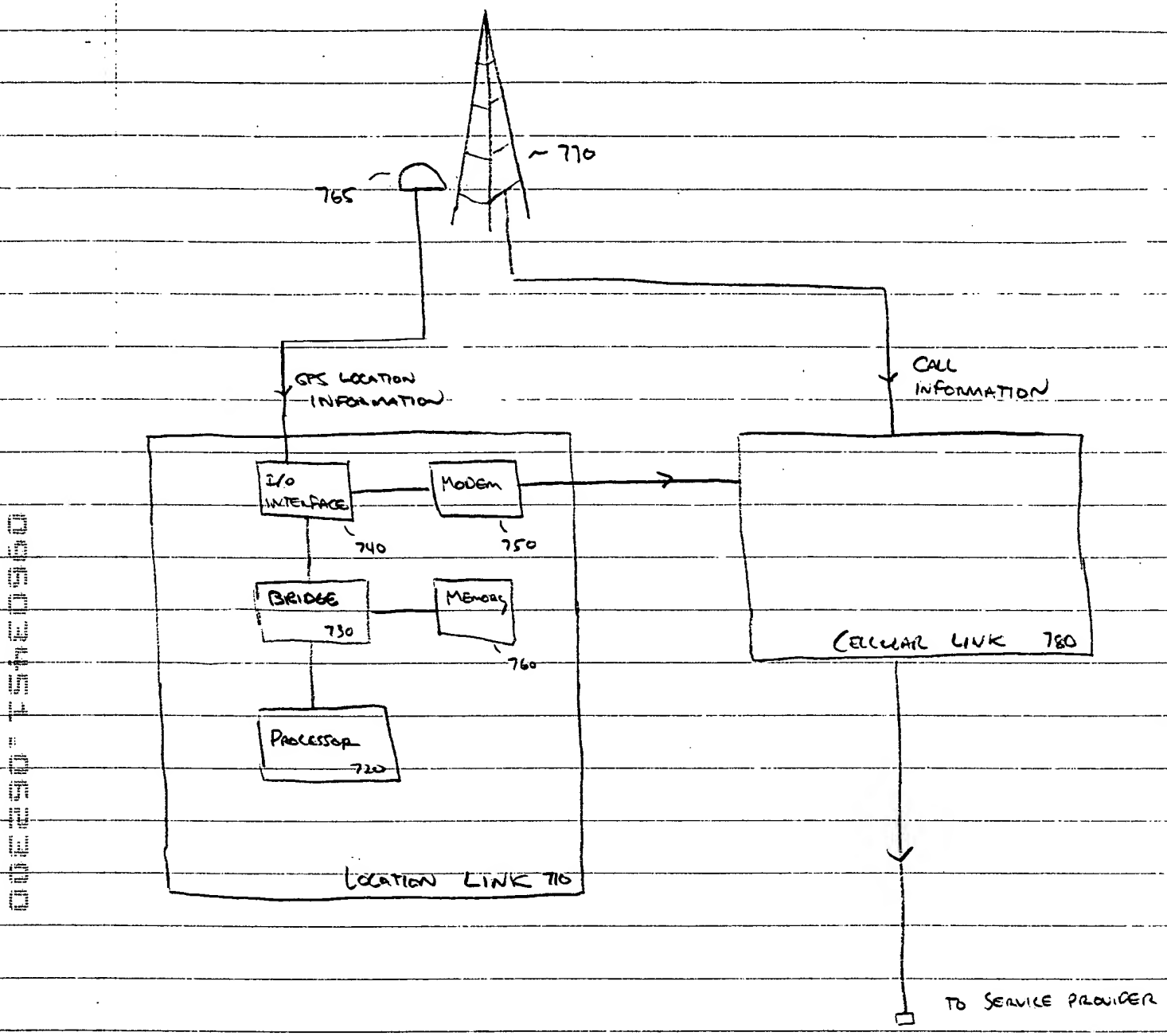

765
770
GPS LOCATION INFORMATION
CALL INFORMATION
I/O INTERFACE
740
MODEM
750
BRIDGE
730
MEMORY
760
PROCESSOR
720
LOCATION LINK 710
CELLULAR LINK 780
TO SERVICE PROVIDER

FIG. 7

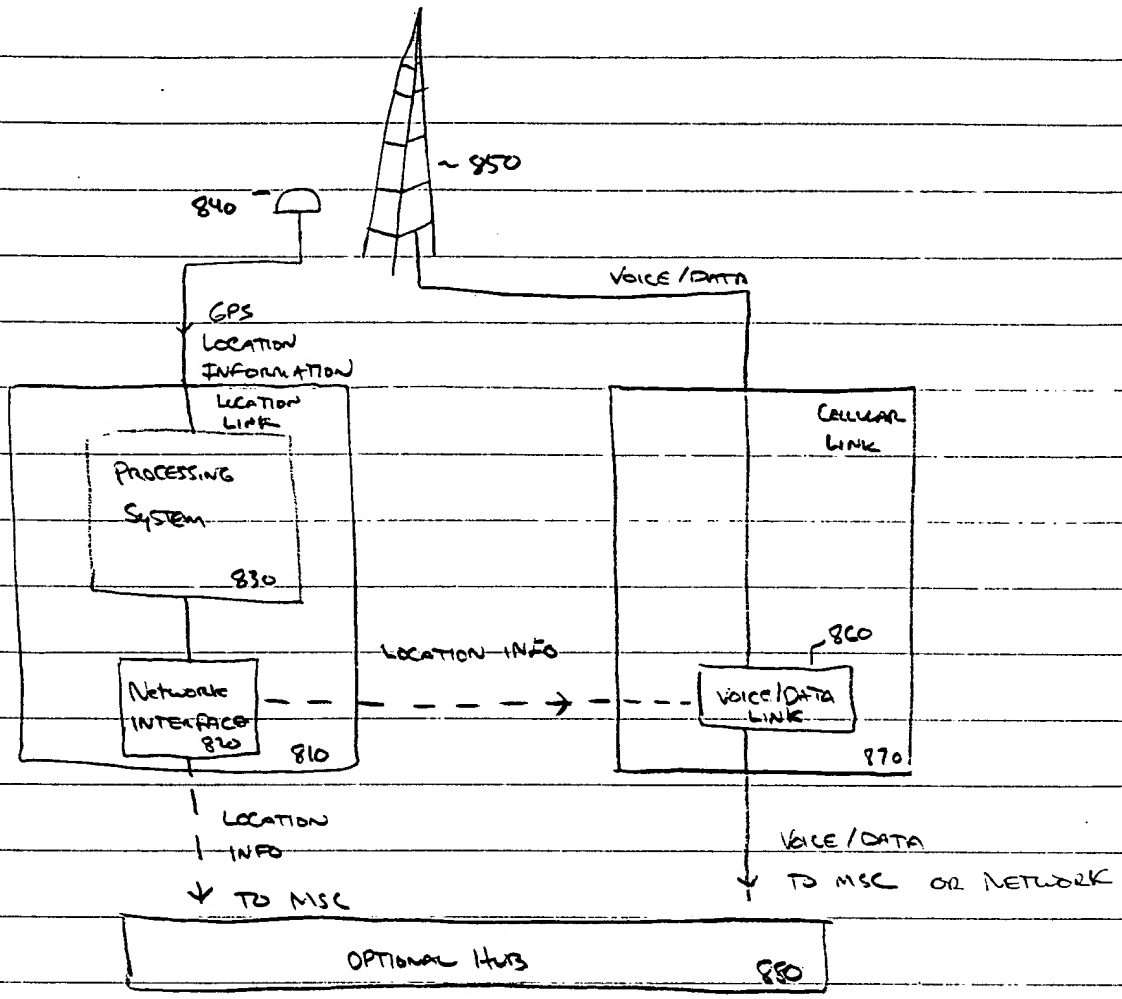

~ 850
840
VOICE / DATA
GPS
LOCATION
INFORMATION
LOCATION
LINK
CELLULAR
LINK
PROCESSING
SYSTEM
830
LOCATION INFO
860
NETWORK
INTERFACE
820
810
VOICE/DATA
LINK
870
LOCATION
INFO
VOICE / DATA
TO MSC
TO MSC OR NETWORK
OPTIONAL HUB
880

FIG. 8

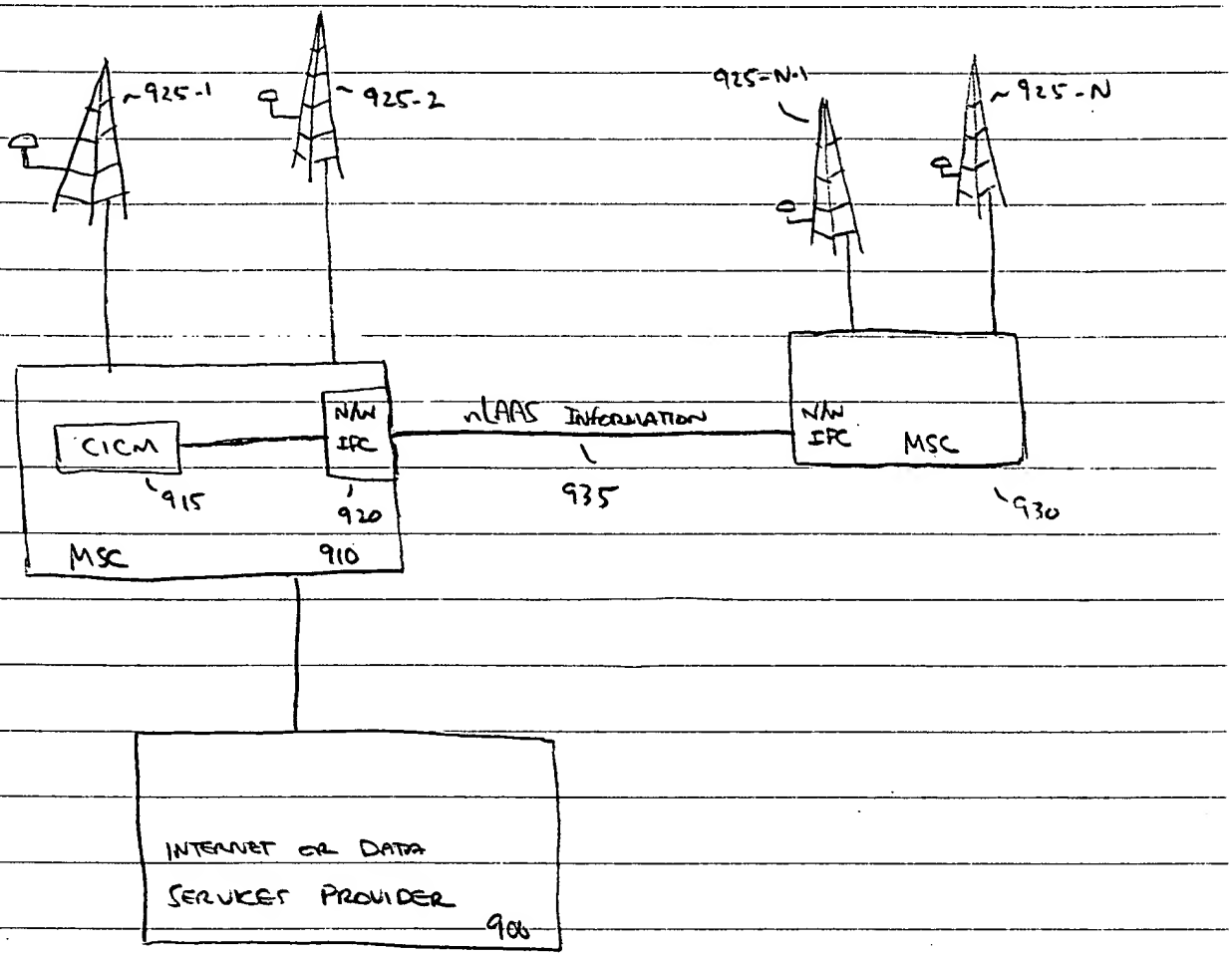

925-1
925-2
925-N-1
925-N
CICM
915
N/W IPC
920
MSC
910
nLAAS INFORMATION
935
N/W IPC
MSC
930
INTERNET OR DATA SERVICES PROVIDER
900

FIG. 9

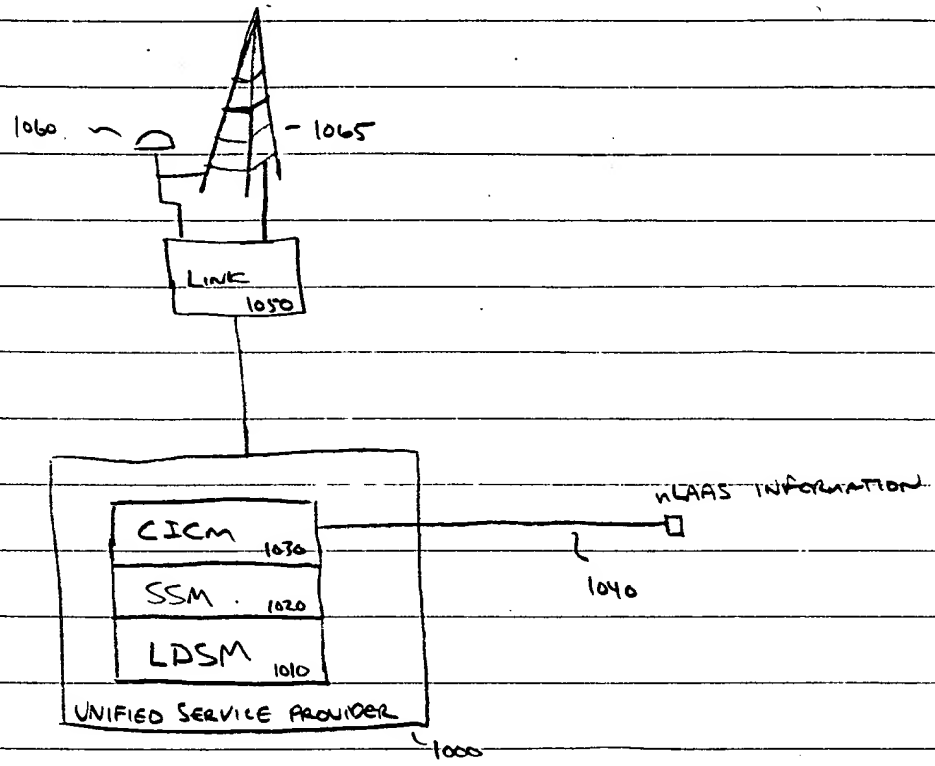

1060
1065
LINK
1050
CICM
1030
SSM
1020
LDSM
1010
UNIFIED SERVICE PROVIDER
1000
nLAAS INFORMATION
1040

FIG. 10

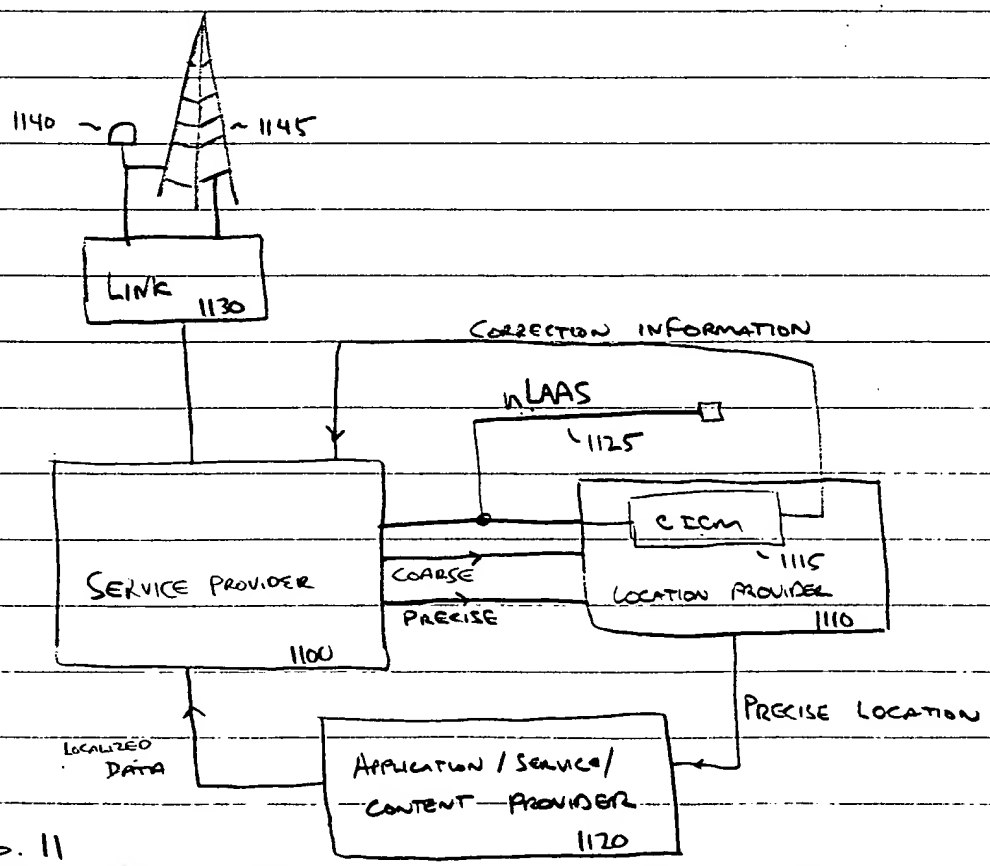

1140
1145
LINK
1130
CORRECTION INFORMATION
nLAAS
1125
CICM
1115
SERVICE PROVIDER
1100
COARSE
PRECISE
LOCATION PROVIDER
1110
PRECISE LOCATION
LOCALIZED DATA
APPLICATION / SERVICE / CONTENT PROVIDER
1120

FIG. 11

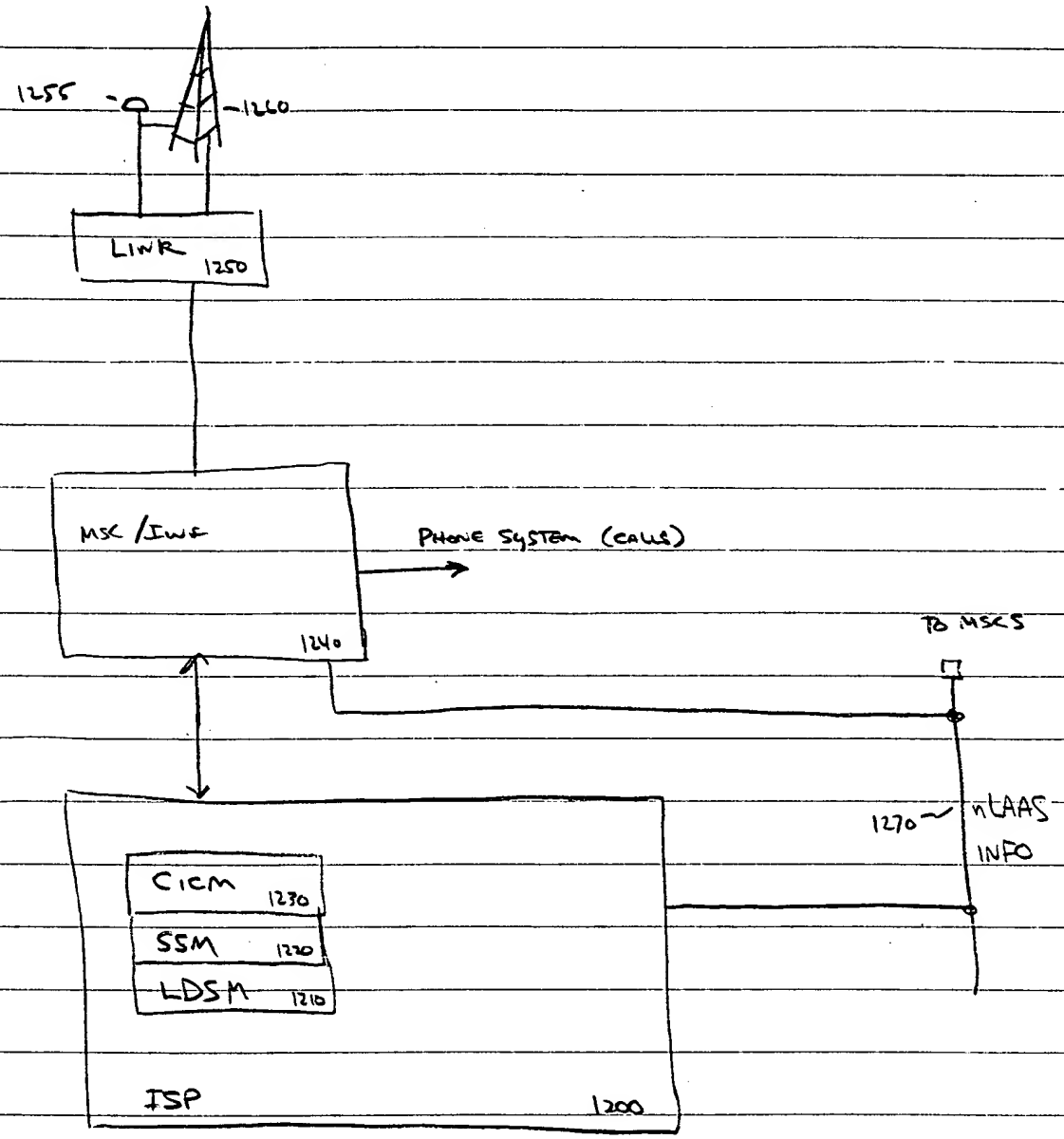

1255
1260
LINK
1250
MSC /IWF
PHONE SYSTEM (CALLS)
1240
TO MSCS
1270
nLAAS
INFO
CICM
1230
SSM
1220
LDSM
1210
ISP
1200

FIG. 12

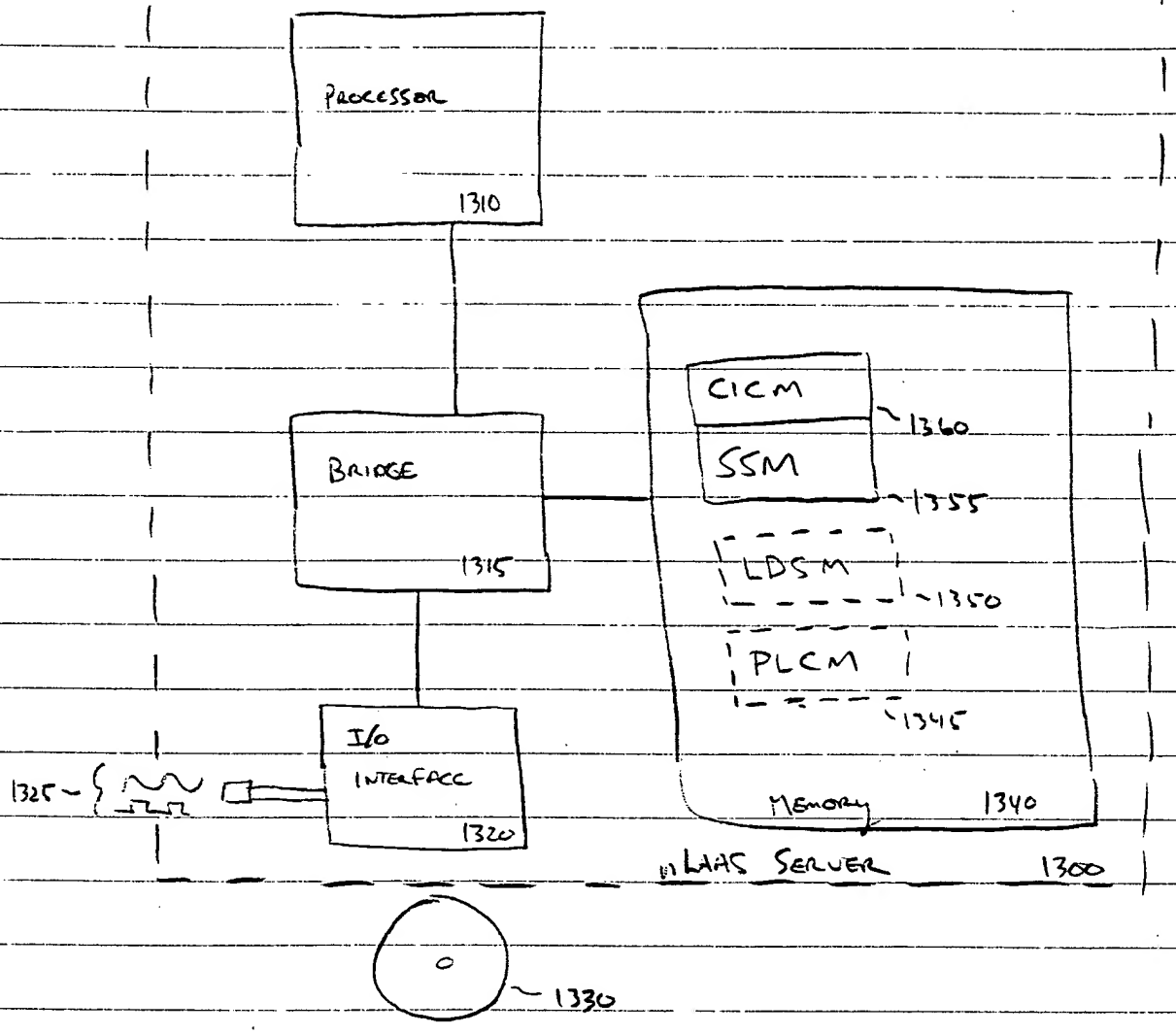

PROCESSOR
1310
BRIDGE
1315
I/O
INTERFACE
1320
1325
CICM
1360
SSM
1355
LDSM
1350
PLCM
1345
MEMORY
1340
LAAS SERVER
1300
1330

FIG. 13